

ON FLEAS COLLECTED BY DR. H. M. JETTMAR IN MONGOLIA
AND MANCHURIA IN 1927 AND 1928.

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(With Plates VII to X.)

THE species of Siphonaptera are evidently very numerous in Siberia and the adjacent districts of Asia. Although Drs. Wagner and Joff as well as ourselves have already described a good many species from that region, the collections dealt with in the present paper prove that the flea fauna has as yet only been sampled. As Dr. Jettmar, to whom we are much indebted for these valuable collections, has formerly sent us material from Transbaikalia, we are now in the position to study the geographical variation of at least some of the Palaearctic Asiatic species. The study of the transmission of diseases, which is so closely linked up with the knowledge of the Ectoparasites which act as vectors or which are potential vectors, we find to be of the greatest assistance to the systematist by furnishing material, a fact we gratefully acknowledge. On the other hand, the collectors of warm-blooded Vertebrates for systematic purposes, who should and might be the chief source of increase in our knowledge of the species of Ectoparasites, as a rule neglect to collect the Arthropods occurring on the mammals and birds obtained, lack of time frequently combined with a narrowness of outlook preventing the collector from going beyond the amassing of skins. Fortunately, there are pleasing exceptions.

The descriptions we give of new forms are as much as possible restricted to essentials sufficient for the purpose of identification and classification. Detailed descriptions will appear in the monograph. When giving the limits of variability, particularly in the case of bristles, it must be understood that the bristles have been counted only in a limited number of specimens and that therefore the numbers given are approximative.

I. MANCHURIA: EXCURSION TO TUNGGLIAO IN SOUTHERN MANCHURIA,
NOVEMBER 1928.1. *Ceratophyllus tesquorum sungaris* subsp. nov. (Pl. VIII, figs. 9 & 10, ♂♂).

Near to *C. t. mongolicus* J. & R. 1911; differs in the exopodite F being more rounded posteriorly, with the apical margin more slanting than in the various other known subspecies. Our figures represent extremes; fig. 10 taken from type of *sungaris*.

A series from: Sand dunes near Ta-Lin, on *Cricetulus arenarius* and in its burrow; sand dunes near Chendjation, in burrows of *Spermophilus* (probably *S. mongolicus*); Tungliao, in abandoned burrow of *Spermophilus* or *Zapus*.

2. *Ophthalmopsylla kukuschkini* Joff 1927.

2 ♂♂ from sand dunes near Chendjation, in burrows of *Spermophilus* (probably *S. mongolicus*); and 1 ♀ from the same place in nest of *Cricetulus griseus fumatus*.

The ♂♂ differ a little *inter se* and from Joff's figure. In one the lower of the subapical spiniform bristles is but slightly shorter than the upper, while in the second specimen it is nearly as much shorter as in Joff's figure. The bristles are more numerous than in the unique specimen described by Joff. On tergite VIII several of the long bristles are marginal, which is not the case in the nearly related *O. volgensis* Wagn. & Joff 1926.

VII. st. of ♀ with a broad shallow upper sinus, the angle above which is very obtuse and strongly rounded; the lobe below this sinus projects considerably, is broad and apically emarginate, with the upper angle strongly rounded, but extending as far backwards as the ventral angle, somewhat similar to Pl. VII, fig. 5.

3. *Ophthalmopsylla jettmari* sp. nov. (Pl. VII, figs. 3 ♀, 4 ♂, 5 ♀).

♂♀. Agrees in essentials with *Ophthalmopsylla* Wagn. & Joff 1926, but has the frontal tubercle rounded. Differs from all allied genera (or subgenera) in the frontal tubercle being close above the oral corner (fig. 4), in the metanotum bearing on each side 3 or 4 blackish apical spines, in the first hindtarsal segment equalling II to IV together, etc.

Head.—Bristles on frons 4 to 6, 3 or 4; on occiput anteriorly 0 to 2, usually 1, in middle 2 or 3. Proboscis reaching to middle or apex of trochanter.

Thorax.—Pronotal comb with 24 or 25 spines. On mesopleura about 20, exclusive of the rather numerous small ones at and near the upper anterior corner; on metepimerum from 18 to 26.

Abdomen.—On tergites I to VII 3 rows, with additional bristles on the anterior segments and on VII; on III. t. in ♂ 46 to 57, 26 to 30, in ♀ 50 to 76, 26 to 30, on the two sides together; in ♂ 1 long and 2 short antepygidial bristles, in ♀ 3 of which the upper is shorter than the bristles of the posterior row of VII. t., the lower one being about one-third shorter than the middle bristle; apical margins of tergites I to VII minutely dentate, on I and II, or also on III, a blackish spine each side.

Legs.—On hindfemur about 20 subventral bristles on outer surface, arranged anteriorly in 2 or 3 rows. Hindtibia with more than 40 bristles all over the outer side. Hindtarsus peculiar in ♂: segment I dorsally at apex with about 7 long thin bristles and in subapical notch 3, the longest apical bristle stout and reaching close to apex of II; in subapical notch of II 5 and at apex 5 to 7 long bristles, all much thinner than the ventral apical ones, the longest dorsal bristle extending to or beyond apex of V; in ♀ the apical bristles of I and II stout, the longest of II not quite reaching to apex of IV.

Modified Segments.—♂: VIII. t. from stigma downwards with over 40 bristles. VIII st. ventrally reduced, extending obliquely upward-anad, ending with a broad membranous lobe which bears numerous small hairs, beyond middle of posterior margin a short projection bearing a pair of long slender bristles. Process P of clasper about $\frac{1}{2}$ shorter than anterior margin of exopodite; acetabular bristle on a short cylindrical projection. Exopodite F a little over twice as long as broad, nose of anterior margin above $\frac{2}{3}$, apical anterior angle 90° , hindmargin somewhat convex to $\frac{2}{3}$, where F widens, from this point to anterior apical angle the margin evenly curved, there being no posterior apical angle; just above middle of widened portion a stout, somewhat claviform spine of which the apex is curved down; below the spine about a dozen marginal

and a dozen lateral bristles, besides a number of smaller ones on the outer surface, 2 of the marginal bristles longer than the others. Ventral arm of IX. st. moderately convex from $\frac{3}{10}$ to $\frac{8}{10}$, bearing here a double row of about 10 long bristles, besides small ventral and lateral hairs; the small apical lobe somewhat resembles a dog's head and bears several dorsal and lateral bristles. Paramere with a dorsal hood each side which is spiculose apically underneath.—♀: VII. st. on the two sides together with 25 to 36 bristles in front of the row of 18 to 21; apical margin slanting, with a broad shallow oblique sinus, below which the segment is subtruncate; from the stigma down on outer side 34 to 50 bristles (inclusive of small ones), on inner side 6 to 8. Spermatheca essentially as in *O. praefectus* J. & R. 1915; chitinized portion of bursa copulatrix elbowed.

Length: ♂♀ 2.9 to 3.3 mm.—Hindfemur ♂♀ 0.61 to 0.67 mm.

A long series from: Sand dunes near Chendjation, in nests of *Cricetulus griseus fumatus*, also off *Cricetulus* sp. and from burrows of *Spermophilus* (perhaps *S. mongolicus*)

4. *Rhadinopsylla dives* sp. nov. (Pl. IX, fig. 16 ♂, 17 ♀).

♂♀. Not very close to any of the known species: genal comb with 8 spines, more rarely 7, pronotal comb with more than 25 spines, on abdominal tergite VIII some bristles above stigma, segment V of all tarsi with 5 pairs of plantar bristles, manubrium of clasper slender, head of spermatheca slightly narrower than midtarsal segment IV is long.

Head.—Frontal tubercle central. Spines of comb long, upper one shorter than the others, but not broader basally than the next, the row gradually slanting upwards, being almost horizontal. Labial palpus with 5 segments.

Thorax.—Pronotal comb with 26 to 28 spines. On mesonotum numerous small bristles between the anterior row and the base, the lateral bare space being small. On metanotum 3 rows, the anterior row irregular.

Abdomen.—Two rows on tergites, and on most segments some additional bristles; I to VI with apical spines, sometimes a spine even on VII.

Legs.—Longest bristle of hindtarsal I not reaching apex of II, and that of II not quite extending to apex of IV.

Modified Segments.—♂: On VIII. st. from 14 to 20 odd bristles, all distant from apical margin. Near dorsal margin of clasper one long bristle, and around the margins about 10 to 14 small ones of various sizes; lower margin of clasper rather strongly ventricose; below or just above lowest point of exopodite a small bristle on clasper. Notch of anterior margin of exopodite a little below middle of margin; posterior margin of F curved from base to apex, but rather more strongly in ventral than in apical half. Upper end of vertical arm of IX. st. angulate on anterior and posterior sides; dorsal margin of ventral arm concave in proximal $\frac{2}{3}$, ventral margin rather strongly rounded-explanate in apical third, being widest at apex, bristles all thin, a dorsal row anteriorly more or less double, distally continued as a subapical and subventral row, of which some bristles are rather larger, on outer surface of apical third about 8 to 11 bristles.—♀: VII. st. with broad, rounded, subventral sinus, above which there is a broad round lobe incrassate in centre; a posterior row of 12 to 14 bristles preceded by 17 to 24, on the two sides together. On outer surface of VIII. t. from above stigma to ventral and apical margins from 36 to 38 bristles, the upper and lower groups not being separated by a bare space; on inner side

at and close to apical margin 8 or 9 spiniform bristles, of which one marginal one is much longer than the others. Head of spermatheca (R.s.) very slightly narrower than midtarsal segment IV is long, tail subcylindrical, its anal side not caved in.

Length: ♂ 2.3 to 2.5 mm.; ♀ 2.8 to 3.3 mm.—Hindfemur ♂ 0.35 to 0.39 mm.; ♀ 0.41 to 0.45 mm.

A series from: Sand dunes near Chendjation and near Ta-Lin, off *Cricetulus* sp. and *Cricetulus griseus fumatus*; also in abandoned burrow of (?) *Spermophilus*.

5. *Rhadinopsylla insolita* sp. nov. (Pl. IX, figs. 18 ♂, 19 ♀).

♂♀. Labial palpus with 6 segments; genal comb with 7 spines, rarely 6; frontal tubercle central in ♂, subcentral in ♀; pronotal comb with about 25 spines; longest apical bristle of hindtarsal II reaching beyond IV. ♂: bristles of VIII. st. at and near apical margin. ♀: VII. st. with deep and narrow subventral slit; tail of spermatheca not caved in.

Head.—Frontal tubercle prominent in both sexes. Genal spines 3 to 7 about equal in length and width, 7th not shorter than 6th, first the shortest and narrowest of all. Proboscis reaching beyond apex of coxa.

Thorax.—Mesonotum with two rows and at least dorsally with additional bristles.

Abdomen.—Tergites I to VI with apical spines, on the two sides together in ♂ 6 to 8, 8 or 9, 8 or 9, 8, 6, 5, or 6, in ♀ 8 to 10, 9 to 11, 8 or 9, 6 to 8, 4 to 6, 3 to 6.

Legs.—Longest bristles of hindtibia and hindtarsal I reach beyond the segment following; on segment V 4 pairs of plantar bristles in all tarsi.

Modified Segments.—♂: VIII. st. with 13 to 16 bristles each side placed at and near the apical margin. Manubrium (M) strongly broadened towards elasper; the latter with one long subdorsal bristle and about 12 small ones, some of them very small; acetabular bristle proximal of acetabulum. Exopodite feebly curved, except at base; notch of anterior margin below middle. Posterior margin of apical dilatation of vertical arm of IX. st. rounded, variable, not distinctly angulate; ventral arm of nearly even width from point of division to apex, much broader than vertical arm, its apex more strongly rounded-slanting dorsally than ventrally; dorsally about middle a double row of short spiniform bristles, the other bristles thin, apical ones longest.—♀: Apical margin of VII. st. strongly slanting dorsally; ventral portion of segment divided by a deep narrow slit, lobe above slit rounded-truncate, with the apex more or less emarginate, lobe below slit pointed in lateral view; on the two sides together 17 to 19 bristles. On VIII. t. at most one bristle above stigma, below stigma a row of 4 or 5, on widened ventral area 13 to 16, and on inside 6 or 7. Spermatheca large, head broader than segment III of midtarsus is long.

Length: ♂ 2.1 to 2.3 mm.; ♀ 2.4 to 2.6 mm.—Hindfemur: ♂ 0.35 mm.; ♀ 0.37 to 0.43 mm.

4 ♂♂, 5 ♀♀ from: Sand dunes near Chendjation and Ta-Lin, in nest of *Cricetulus* sp.

6. *Rhadinopsylla tenella* sp. nov. (Pl. IX, figs. 20 ♀, 21 ♂).

A small species, with 5 genal spines, of which the upper one is much broader and much more dorsal than the ventral spine. Labial palpus with 5 segments.

In pronotal comb 16 or 17 spines. Longest apical bristle of hindtarsal II extending beyond IV; in all tarsi V with 4 pairs of plantar bristles. ♂: exopodite together with apical portion of clasper almost circular; ventral arm of IX. st. very slender. ♀: tail of spermatheca caved in; below stigma of VIII. t. one bristle, none above stigma.—Agrees with *Rh. dahurica* J. & R. 1923 in one apical bristle of hindtarsal II being long; otherwise very different.

Head.—Frontal tubercle a little more prominent in ♂ than in ♀, a little below centre in ♀. 5th genal spine more than twice as broad at base than 1st spine and a little longer, being about $\frac{1}{3}$ shorter than 4th spine.

Thorax.—Pronotum short (apart from comb), shorter above middle of side than midtarsal I.

Abdomen.—Tergites with 2 rows of bristles, in ♂ anterior row incomplete on II and III and absent from IV to VII, in ♀ anterior row incomplete on V to VII; apical spines (on the two sides together) in ♂ 6, 6, 4, 4, 2, 2, in ♀ 6, 5, 2, 2, 0. Sternites IV to VII in ♂ 4 bristles on the two sides together, in ♀ 5 or 6 on III to V, 7 on VI.

Legs.—Longest apical bristle of hindtibia and of hindtarsal I extending beyond apex of segment following, that of II well beyond IV. In ♂ V of right hindtarsus with 4 plantar bristles on one side and 3 on the other. Length: midtarsus ♂ 9.5, 8.5, 6, 4, 11, ♀ 11, 9, 6.5, 5, 12.5; hindtarsus ♂ 21, 13, 8, 6, 12.5, ♀ 24, 16, 9.5, 6, 14.

Modified Segments.—♂: VIII. st. with a row of 3 bristles on each side. Manubrium of clasper gradually, but not strongly, widened towards base. Distal half of clasper peculiar (fig. 21), being strongly ventricose and dorso-apically strongly rounded, with the acetabulum extending close to apex, the nose above the acetabulum very prominent and subapical; one long subdorsal bristle and near it 2 much smaller marginal ones, at apex minute pale bristles, each on a more or less distinct tooth, on inner side some minute subapical bristles. Exopodite narrow, curved in basal half, almost straight in apical half; the notch of the anterior margin subapical. Upper end of vertical arm of IX. st. rounded-angulate on posterior side; ventral arm, from the point of division, narrower than the vertical arm, remaining slender to apex; at and near dorsal margin 6 small pale spiniform bristles from middle to near apex, at apex and subventrally and ventrally near it about a dozen small pale bristles.—♀: VII. st., on the two sides together, with a row of 8 bristles, in front of the row one or no bristle; no sinus, the lateral lobe very broad and rounded (fig. 20). VIII. t. with a single bristle below stigma, on widened portion of segment 8 bristles on outside and 7 or 8 on the inside. Head of spermatheca as broad as hindtarsal IV is long, gradually narrowing into the tail, which is caved in on anal side and bears a projection below the cavity.

Length: ♂ 1.5 mm.; ♀ 1.8 mm.—Hindfemur: ♂ 0.27 mm.; ♀ 0.28 mm.

One pair from: Sand dunes near Chendjatie, in nest of *Cricetulus* sp.

7. *Neopsylla bidentatiformis* Wagn. 1893.

A series from: Sand dunes near Chendjatie and Ta-Lin, on and in nests of *Cricetulus* sp., also in burrows of *Cricetulus griseus fumatus* and *Spermophilus* (probably *S. mongolicus*).

II. FLEAS COLLECTED DURING AN EXCURSION FROM HARBIN VIA SANSIN, LAHASSU, TAHEIHO TO NUNKIANG (= MERGEN) IN MANCHURIA, MAY-JULY 1928.

1. *Ceratophyllus tesquorum sungaris*, cf. p. 155.

A series from Bank of Sungari R. opposite Harbin, on *Spermophilus* (probably *S. mongolicus*), June 1928.

2. *Oropsylla elana* sp. nov. (Pl. VIII, figs. 7 & 8 ♀♀).

♀. Similar to *O. crassus* J. & R. 1911. Proboscis a little shorter. Frontal tubercle very small, barely traceable. Apex of genal process evenly rounded, dorsally not more projecting than ventrally, a little shorter than in *O. crassus*. Anterior frontal row represented by one bristle or absent.

Pronotum (from basal margin to base of comb) shorter than spines of comb, measurements at 3rd or 4th spine (counted from below) in *O. elana* 13 to 15, 17 to 19, in *O. crassus* 20 or 21, 16. In comb 23 to 26 spines inclusive of small ventral ones (in type 26).

VII. st. truncate, upper angle distinct, in one specimen a little more rounded than in fig. 7, apical margin slightly variable, sometimes a little convex below middle, as in fig. 7, sometimes nearly straight or very slightly incurved. Stylet with 3 lateral bristles as in *O. crassus*. Below stigma of VIII. t. 2 to 6 bristles, on widened portion of this segment 21 to 24 on outside and 3 or 4 on inside, one of the latter being marginal. Head of spermatheca larger than in *O. crassus*, somewhat variable in shape as illustrated by figs. 7 (from type) and 8.

Length: 3.2 to 3.4 mm. (specimens somewhat distended.)—Hindfemur: 0.56 mm.

Manchuria: Bank of Sungari R. opposite Harbin (= Charbin), 2 ♀♀ (type) on *Spermophilus* (probably *S. mongolicus*), June 1928; 2 ♀♀ from Anda Steppe near Harbin, on *Cricetulus campbelli*.

3. *Frontopsylla elatus botis* subsp. nov. (Pl. VIII, figs. 14 ♂, 15 ♀).

♂♀. Very near *F. elatus* J. & R. 1915, *F. elatoides* Wagn. 1929 and *F. luculentus* J. & R. 1923; but nearest to *F. elatus*. All these fleas may possibly be subspecies of one species. I treat the present form as a subspecies of *F. elatus* in order to draw attention to this suggestion.

The new form differs from the others especially in the ♂.—♂: Bristles at apical-dorsal margin of VIII. t. as in *F. luculentus*, long ones more or less alternating, or mixed, with shorter and thinner ones. Process P of elasper essentially as in *F. e. elatus*, but shorter, being even a little shorter than in *F. e. elatoides*. Apical margin of exopodite F shorter than in *F. e. elatus*, its longish bristle a little farther away from the stout spine, posterior margin but slightly incurved, the row of bristles below the spine slanting, the most ventral ones farther away from dorsal margin than in *F. e. elatus*; IX. st. as in *P. e. elatus* without an excision beyond the setiferous area, beyond the short spine some ventral marginal bristles, but not so many as in *F. luculentus*.—♀: VII. st. similar to that of *F. e. elatus* as figured by Joff in 1927. Below stigma of VIII. t. 1 long bristle and from 1 to 3 short ones; on the widened lower and apical portion 14 to 19 bristles, there being a wide gap between these bristles and those below the stigma.

2 ♂♂, 4 ♀♀ from Charithun near Nungkiang off a rat, probably not *R. norwegicus*; the specimens were presented to Dr. Jettmar.

4. *Amphipsylla vinogradovi* Joff 1927.

4 ♀♀ from Sansin, off *Cricetulus furunculus*. Identified from Joff's figures. The duct of the bursa copulatrix is much shorter and thicker than in the following species and its upper half curved anad, not forward. Abdominal sternites V and VI with strong vertical median incassation.

5. *Amphipsylla aspalacis* sp. nov. (Pl. VIII, figs. 22 ♂, 24 ♀).

♂: exopodite much slenderer than in *A. primaris* J. & R. 1915, its upper anterior angle very obtuse. ♀: duct of bursa copulatrix long and thin, its upper half curved forward (or downward).

♂♀. *Head*.—Proboscis nearly extending to apex of coxa. One anterior occipital bristle.

Thorax.—Three rows on mesonotum with additional dorsal bristles, two rows on metanotum. On mesopleura 15 to 20 bristles, on metepisternum 4 or 5, on metepimerum in ♂ 10 to 13, in ♀ 12 to 16.

Abdomen.—Apical spines: ♂ I 4, II 4, III 2 or 3, IV 2, V 1 or 2; ♀ I 4, II 3 to 5, III 3 or 4, IV 2, V 0. Bristles on tergites: ♂ III 21 to 27, 20 to 22, IV 20 to 22, 19 to 21, VI 18 to 22, 18 to 21, VII 11 to 21, 19 to 22; ♀ III 23 to 34, 18 to 21, IV 24 to 30, 18 to 22, VI 21 to 25, 17 or 18, VII 23, 14 or 15. Two or three bristles of posterior row below stigma, usually two, occasionally one on VII. On sternites: ♂ III 7 to 10, IV, V and VI 10 to 12, VII 9 to 14, occasionally one small bristle in front of the row; ♀ III 1 to 3, 14, IV 3 to 6, 14 to 16, V 4 to 6, 15 or 16, VI 2 to 5, 15 to 19, VII 5 to 8, 19 to 27.

Legs.—On outside of hindtibia from 13 to 19 dorso-lateral bristles.

Modified Segments.—♂: The bristles of VIII. st. are drawn curved as they appear, accidentally, in the mounted specimens; in the unmounted specimens they are more or less straight and directed backwards. Exopodite similar to that of *A. primaris*, longer and narrower, with the upper anterior angle, which is about 90° in *A. primaris*, very obtuse: close below posterior angle a stout spiniform, at angle a pale subspiniform bristle, on inside near apical margin an oblique row of three, of which the first and third are spiniform, the middle one an ordinary pointed bristle; much above middle of posterior margin a spiniform, between the two marginal spiniforms 5 thin marginal bristles. Ventral arm of IX. st. distinctly longer than vertical arm, setiferous antemedian area less convex than in *A. primaris*.—♀: VIII. t. with one long bristle below stigma and 2 to 4 small ones, on widened area 23 to 26 on outside and 3 or 4 on inside, of which latter one is marginal. Head of spermatheca a little longer than tail (the latter measured in a straight line from ventral margin to tip) and sharply separated from it. Duct of bursa copulatrix about as long as first hindtarsal segment. Stylet very slightly upcurved.

Length: ♂ 2.4 to 2.7 mm.; ♀ 2.7 to 3.0 mm.—Hindfemur: ♂ 0.43 mm.; ♀ 43 to 0.48 mm.

A series from Sansin, end of May, and one ♀ from Lahassu, early July, all off *Myotalpa aspalax* (= *Siphneus*).

6. *Neopsylla bidentatiformis* Wagn. 1893.

A small series from Sansin, end of May, off *Crecetulus furunculus* and *C. triton*.

7. *Rhadinopsylla jaonis* Jord. 1929.

One ♀ from Sansin, end of May, off *Myotalpa aspalax*.

Originally described from a damaged ♀. The present ♀ is in fairly good order. Hindtibia with 6 dorso-lateral bristles on outside, none on inside; tips of long bristles of hindtarsus broken off, longest apical of segment I evidently reaching beyond III, that of II probably to or beyond apex of V. Spermatheca as figured in Nov. Zool. p. 40, but, as was to be expected, the head more strongly narrowing towards tail than in the split spermatheca of the type-specimen.

8. *Pectinoctenus adalis* sp. nov. (Pl. VII, fig. 6).

♂. Chaetotaxy essentially as in *P. lauta* Roths. 1915 (described as *Leptopsylla*). Genal comb with 15 spines; pronotal comb with 32. In front of the posterior row 3 rows on mesonotum, 2 on metanotum; on metepimerum 8 bristles (4, 3, 1). Abdominal tergites with 2 rows, the posterior one containing 15 bristles on III, on the two sides together.

Modified Segments.—♂: VIII. t. with 8 bristles on widened area below stigma; VIII. st. shorter and broader than in *P. lauta*, triangular in lateral aspect, with the base widened upwards, apart from this upward extension the sclerite, measured from the most proximal bristles to the dorsal margin and the apex, a very little more than $\frac{1}{2}$ as broad as long; at ventral margin from beyond middle a row of bristles, the row proximally more or less irregularly double, the 3 distal bristles the longest. Clasper and exopodite in shape nearly as in *P. pectiniceps* Wagn. 1893, but the exopodite without short stout spiniform: process of clasper and exopodite claw-like at end, the brown tips curved towards each other; exopodite widest above middle, the posterior margin rounded from this point to tip, at this rounded margin 2 long bristles below apex and further down about 6, the second (from above) of this row about as thick as the long subapical bristles, but very much shorter, being homologous with the spiniform of *P. pectiniceps*.

One ♂ from Charithum near Nunkiang (= Mergen), off a rat (probably not *R. norvegicus*); presented to, not collected by, Dr. Jettmar.

9. *Myodopsylla trisellis* sp. nov. (Pl. IX, figs. 23 ♂, 26 ♀).

♂♀. A very interesting discovery. Agrees in all essentials with the American genus *Myodopsylla*, particularly with the North American species. Metanotum without apical spine. Abdominal tergites I to III with false comb.

Meso- and metanotum with 3 rows of bristles; mesopleura with 10 to 15 bristles, metepisternum with 2, metepimerum with 7 to 10, usually 8 or 9, 2 of which are apical. Abdominal tergites I and II with 3 rows, the others with 2, but the anterior row with few bristles, particularly on the posterior segments. On outer side of hindtibia a subdorsal row of 9 or 10, apical bristle included.

Modified Segments.—♂: VIII. st. with a broad, rounded apical lobe which bears numerous moderately small bristles on the outer and inner surfaces, the outerside bristles being somewhat stouter than those of the inner side, at dorso-

apical margin 3 or 4 long ones. Clasper with an apical sinus which separates from the main apical portion a conical process (P) that bears 2 longish bristles. Exopodite F less than twice as long as broad, curved near base, bearing at elbow of posterior margin a long bristle, from elbow to apex subconical. Manubrium (M) broad, evenly curved, without projection on upper side. Ventral arm of IX. st. with a ventral sinus at $\frac{2}{3}$, beyond which there are 2 bristles, further distad 2 thin ones and one at apex. Paramere (Par) broad, entire, incurved in middle, somewhat sole-shaped (variable in outline according to its position on slide).—♀: VII. st. on the two sides together with a row of 11 to 13 bristles, and 4 or 5 in front of the row, apical margin strongly slanting. Spermatheca similar to that of *M. insignis* Roths. 1903; bursa copulatrix shorter than in that species. On outside of VIII. t. 18 to 23 bristles, on inside 3 to 5, of which one is marginal.

Length: ♂ 2.0 to 2.5 mm.; ♀ 2.5 to 2.7 mm.—Hindfemur ♂♀ 0.40 to 0.45 mm.

A series from Charithun near Nunkiang (= Mergen), in temple, off *Pipistrellus* sp., July 1928.

III. MONGOLIA: SUNGEI VALLEY NEAR URGU, 1927.

1. *Ceratophyllus gallinae* Sebrank 1803.

1 ♀ on table in room, 26 July.

2. *Ceratophyllus runatus* J. & R. 1923.

2 ♂♂, 1 ♀ in burrow of *Ochotona dahurica*, May.

3. *Oropsylla silantiewi* Wagn. 1898.

A small series, also some larvae, August, from *Arctomys bobac*. We have this Asiatic marmot-flea also from the Himalayas.

4. *Frontopsylla wagneri* Joff, 1927.

This species must not be confused with *Ceratophyllus wagneri* Baker 1904. A series from burrow of *Ochotona dahurica*, May.

5. *Frontopsylla luculentus parilis* subsp. nov. (Pl. VIII, fig. 13 ♂).

Apparently differs only in the ♂; process P of clasper reaching a little above or to anterior apical angle of exopodite F, being longer than in *F. luculentus* J. & R. 1923.

A large series: from burrows of *Ochotona dahurica*, from *Microtus economus* and *Alactaga mongolica*, and single specimens from burrows of *Arctomys bobac* and *Spermophilus*, May and July.

6. *Ophthalmopsylla praefectus pernix* subsp. nov. (Pl. VII, figs. 1 ♂, 2 ♀).

♂♀. Differs from *O. p. praefectus* J. & R. 1925 more conspicuously in the ♀ than in the ♂.—♂: Exopodite F broader in proportion to its length; sub-spiniform below apical spiniform nearer to apical angle; projection bearing acetabular bristle a little shorter.

♀: VII. st. with a rounded, rather deep, sinus.

5 ♂♂, 4 ♀♀ from *Alactaga mongolica*, July, and burrows of *Ochotona dahurica*, May.

7. *Amphipsylla mitis* sp. nov. (Pl. IX, fig. 25 ♀).

♀. Similar to *A. casis* J. & R. 1911. As in that species the margin of VII. t. is somewhat dilated at a short distance below the antepygidial bristles, and the duct of the bursa copulatrix is very long and slender.

Bristles on frons 5 or 6, 2, 2, on occiput 1, 3, 7 or 8, on each side. Proboscis reaching to or close to apex of forecoxa. Bristles on mesopleura 10 or 12, on metepisternum 3, more rarely 4, on metepimerum 6, more rarely 7 (2, 3, 1 or 2, 4, 1). On abdominal tergites two rows, with a few additional dorsal bristles, the numbers varying: on II 15 to 18, 16 or 17, III 13 to 21, 16; only one bristle of posterior row below stigma. Sternites IV, V and VI with median vertical incassation, strongest in VI; on VII 6 or 7, 16 or 17 bristles, on the two sides together, the anterior series probably varying more considerably than in the two specimens available; posterior margin of VII. t. slightly incurved, with the upper angle strongly rounded. On lower, widened, area of VIII. t. 18 bristles on outer side, 2 of which are apical. Spermatheca (R.s.) rather strongly convex dorsally and concave ventrally. Duct of bursa copulatrix slender, as long as first hindtarsal segment, strongly arched. Stylet slightly upcurved.

Length 2.5 mm.

2 ♀♀ from *Microtus economus*, May.

8. *Neopsylla bidentatiformis* Wagn. 1893.

Known to occur from the Crimea to Transbaicalia.

A series on *Ochotona dahurica*, July.

IV. HARBIN.

Among the fleas collected by Dr. Jettmar off *Rattus norvegicus* in the laboratory at Harbin there is a series of *Ceratophyllus anisus* Roths. 1907, which was originally described from a single Japanese ♂. In the mounted type the exopodite is in such a position that the apical bristles are covered by the bristles of VIII. t., in consequence of which the longish subapical bristle was not noticed. We give here a figure taken from another Japanese specimen (Pl. VIII, fig. 12). The exopodite F varies in the shape of its apical portion, in some specimens from Manchuria the apex being much less rounded posteriorly than in our figure. We add a figure of VII. st., spermatheca and bursa copulatrix of ♀ (Pl. VIII, fig. 11). The spermatheca is similar to that of certain Bird-*Ceratophyllus*.
